



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,840	02/25/2004	Shoji Ikeda		2955

7590 02/16/2006

Patrick G. Burns, Esq.  
GREER, BURNS & CRAIN, LTD.  
Suite 2500  
300 South Wacker Dr.  
Chicago, IL 60606

EXAMINER

BERNATZ, KEVIN M

ART UNIT PAPER NUMBER

1773

DATE MAILED: 02/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/786,840	<b>Applicant(s)</b> IKEDA ET AL.	
	<b>Examiner</b> Kevin M. Bernatz	<b>Art Unit</b> 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
 4a) Of the above claim(s) 3-6, 8, 9 and 11-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7 and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/25/04</u> . | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Species I (claims 1, 2, 7 and 10) in the paper filed December 2, 2005 is acknowledged. Claims 3 – 6, 8, 9 and 11 – 16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. The requirement is still deemed proper and is therefore made FINAL.

### ***Specification***

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The disclosure is objected to because of at least the following informalities: page 6, line 10: "coercivit" is a typographical error for "coercivity". Appropriate correction is required.

The Examiner also notes that the language on page 5, line 2 reciting an "anisotropy magnetic field of 0.8 kA/m or more" appears to be incorrect and should probably recite a "saturated magnetic field of 0.8 kA/m or more" (see 112 1<sup>st</sup> Paragraph rejection below).

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 2, 7 and 10 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a magnetic film comprising a saturated magnetic field,  $H_s$ , of 0.8 kA/m or more (*see Figures 1 and 2*), does not reasonably provide enablement for a magnetic film possessing an anisotropic magnetic field of 0.8 kA/m or more. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The Examiner notes that this appears to be an inadvertent error and that the claims should recite a “saturated magnetic field of 0.8 kA/m” (*see also specification, page 9, lines 19 – 27*). While applicants do have literal support for the language of the claims (i.e. specification, page 5, line 2 recites the “anisotropy magnetic field is 0.8 kA/m or more”), the Examiner notes that the disclosure of the invention only provides enablement for making an invention wherein  $H_s$  is 0.8 kA/m or more.

For the purposes of evaluating the prior art, the Examiner has interpreted the above claims as being read upon by *either* a saturated magnetic field ( $H_s$ ) of 0.8 kA/m or more, or an anisotropy magnetic field ( $H_k$ ) or 0.8 kA/m or more. The Examiner notes that 0.8 kA/m equals 9.4 Oersteds (Oe).

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 1773

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 2, 7 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The language "a magnetic film" comprising "a nonmagnetic layer" is confusing since a magnetic film is *magnetic*, not non-magnetic, so it is unclear what the preamble is actually referring to. The Examiner notes that this rejection can be overcome by amending the claims and specification to recite "A magnetic film laminate ... comprising".

Claim 2 recites the language: a "residual stress in said film is +/- 0.5 GPa or less", which is indefinite since it is essentially reciting two ranges: "+0.5 GPa or less" and "-0.5 GPa or less". For the purposes of evaluating the prior art, the Examiner has interpreted this claim as reciting that the stress is between +0.5 GPa and -0.5 GPa (i.e. a near 0 stress is desired).

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1773

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 2 and 10 are rejected under 35 U.S.C. 102(a) and/or (b) as being anticipated by Katada et al. (IEEE Trans. Mag., 38(5), 9/2002, 2225 – 2227), as evidenced by Intermetallic Compounds, Volume 4 (*Pub. John Wiley & Sons, 2000, pages 31 – 33*).

Regarding claim 1, Katada et al. disclose a magnetic film laminate for a magnetic head (*Introduction section*) comprising a nonmagnetic layer including at least one element meeting applicants' claimed Markush limitations (*Introduction section – "nonmagnetic NiFeCr films"*) and a magnetic layer including Fe and Co (*Title*), wherein the anisotropy magnetic field is 0.8 kA/m or more (*Section 2 and Figure 4, where the Examiner notes that 0.8 kA/M = 9.4 Oe*).

In the event that the claim requires a *saturated* magnetic field ( $H_s$ ) or 0.8 kA/m (9.4 Oe) or more, it has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. Therefore, the *prime facie* case can be rebutted by **evidence** showing that the prior art products do not

Art Unit: 1773

necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In the instant case, the Examiner notes that the magnitude of  $H_s$  is calculated from the hysteresis curve on a B-H plot (e.g. see *applicants' Figures 1 and 2 and Intermetallic Compounds, Volume 4 – pages 31 – 33*).  $H_s$  is the magnitude of the coercivity at saturation (*x axis value at the point of saturation*), which is always greater than or equal to the magnitude of  $H_c$ , easy or hard axis (*x axis value at the point that the curve crosses the axis*). The Examiner notes that Katada et al. disclose a hysteresis curve showing a  $H_c$ , easy axis of 12.9 Oe (*Figure 3*). It is therefore the Examiner's position that the embodiment represented by Figure 3 inherently possesses a saturated magnetic field,  $H_s$ , greater than 12.9 Oe, which meets the claimed limitations of 9.4 Oe or more.

Regarding claim 2, Katada et al. disclose that the films possess uniaxial magnetic anisotropy (*Experimental section*). The Examiner deems that there is sound basis for a position that the disclosed films inherently possess a residual stress within the range of +/- 0.5 GPa given that Katada et al. comment that the films "are strongly affected by the difference of thermal expansion coefficient  $\alpha$  between the films and the substrates" (*page 2227 – first full paragraph under Figure 5*) but that "no significant difference magnetization in curves were observed" even when the films were deposited

on a variety of substrates. I.e. the films would appear to be in an equilibrium, non-stressed, state regardless of the substrate used since a stressed film would be expected to experience a different magnitude of stress depending on the substrate choice.

Regarding claim 10, Katada et al. disclose saturation magnetic flux densities meeting applicants' claimed range limitation (*page 2226, last line on page*).

9. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwasaki et al. (U.S. Patent No. 5,587,026).

Regarding claim 1, Iwasaki et al. disclose a magnetic film laminate for a magnetic head (*col. 1, lines 15 - 19*) comprising a nonmagnetic layer including at least one element meeting applicants' claimed Markush limitations (*example 8*) and a magnetic layer including Fe and Co (*example 8*), wherein the anisotropy magnetic field is 0.8 kA/m or more (*example 8, col. 16, lines 51 - 55 - overlap of 800 - 1420 A/m and Figures 24 and 25*).

In the event that the claim requires a *saturated* magnetic field ( $H_s$ ) or 0.8 kA/m (9.4 Oe) or more, Iwasaki et al. teach such a value (*col. 18, lines 56 - 64 and Figure 32*).

Regarding claim 2, Iwasaki et al. disclose that the films possess uniaxial magnetic anisotropy (*example 8, col. 15, lines 37 - 38*). The Examiner deems that there is sound basis for a position that the disclosed films inherently possess a residual stress within the range of  $\pm 0.5$  GPa given that Iwasaki et al. imparting the anisotropy by

Art Unit: 1773

annealing the films (as opposed to stress-induced anisotropy), wherein the Examiner takes official notice that it is known to one of ordinary skill that annealing a material reduces stress within a material by allowing for molecular motion. The Examiner notes that Iwasaki et al. anneals his films twice at temperatures up to 700 °C (*col. 16, line 25 bridging col. 17, line 46*). For support of the Examiner's position of Official notice, the Examiner points to Figures 26 and 27 of Iwasaki et al. which clearly shows molecular rearrangement upon annealing.

10. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Saito et al. (U.S. Patent No. 5,304,975).

Regarding claim 1, Saito et al. disclose a magnetic film laminate for a magnetic head (*col. 1, lines 6 - 12*) comprising a nonmagnetic layer including at least one element meeting applicants' claimed Markush limitations (*col. 7, lines 46 - 56*) and a magnetic layer including Fe and Co (*col. 7, lines 21 - 25 and col. 8, lines 3 - 8*), wherein the saturated magnetic field is 0.8 kA/m or more (*Figures 2, 13, 18 and 21 and col. 13, lines 1 - 17*).

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katada et al. as applied above, and further in view of Osaka et al. (U.S. Patent No. 6,063,512).

Katada et al. is relied upon as described above.

While the Examiner maintains that there is sound basis for the position that the disclosed invention inherently meets applicants' claimed stress limitations, the Examiner acknowledges that Katada et al. fail to explicitly disclose controlling the stress to within  $\pm 0.5$  GPa.

However, Osaka et al. teach the importance of controlling the magnitude of the stress in a film to be near 0 in order to insure films of uniform quality (*col. 5, lines 60 - 62*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the magnitude of the film stress through routine experimentation, especially given the teaching in Osaka et al. regarding the desire to minimize the film stress to insure uniform film quality in magnetic head applications. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katada et al. as applied above, and further in view of Kamiguchi et al. (U.S. Patent No. 6,303,218 B1).

Katada et al. is relied upon as described above.

Katada et al. fail to disclose a surface roughness of the film.

However, Kamiguchi et al. teach the importance of controlling the magnitude of the surface roughness of the films forming a magneto-resistive sensor to magnitudes of less than 1 nm in order to insure good magnetic characteristics and reduced inter-diffusion of atoms (*col. 9, line 26 bridging col. 10, line 20*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the magnitude of the film surface roughness through routine experimentation, especially given the teaching in Kamiguchi et al. regarding the desire to minimize the surface roughness to values meeting applicants' claimed limitations in order to insure good magnetic characteristics and reduced inter-diffusion of atoms.

14. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. as applied above, and further in view of Osaka et al. ('512).

Iwasaki et al. is relied upon as described above.

While the Examiner maintains that there is sound basis for the position that the disclosed invention inherently meets applicants' claimed stress limitations, the Examiner acknowledges that Iwasaki et al. fail to explicitly disclose controlling the stress to within  $\pm 0.5$  GPa.

However, Osaka et al. teach the importance of controlling the magnitude of the stress in a film to be near 0 in order to insure films of uniform quality (*col. 5, lines 60 - 62*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as

Art Unit: 1773

the magnitude of the film stress through routine experimentation, especially given the teaching in Osaka et al. regarding the desire to minimize the film stress to insure uniform film quality in magnetic head applications.

15. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. as applied above, and further in view of Kamiguchi et al. ('218 B1) and Inoue et al. (U.S. Patent App. No. 2002/0187565 A1).

Iwasaki et al. is relied upon as described above.

Iwasaki et al. fail to disclose a surface roughness of the film.

However, Kamiguchi et al. teach the importance of controlling the magnitude of the surface roughness of the films forming a magneto-resistive sensor to magnitudes of less than 1 nm in order to insure good magnetic characteristics and reduced inter-diffusion of atoms (*col. 9, line 26 bridging col. 10, line 20*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the magnitude of the film surface roughness through routine experimentation, especially given the teaching in Kamiguchi et al. regarding the desire to minimize the surface roughness to values meeting applicants' claimed limitations in order to insure good magnetic characteristics and reduced inter-diffusion of atoms. The Examiner notes that Inoue et al. teach the importance of controlling the surface roughness for both MR applications (*as in Kamiguchi et al.*) and metal-in-gap (MiG) head applications (*as in Iwasaki et al.*) (*Paragraph 0115*).

16. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. as applied above, and further in view of Sun et al. (IEEE Trans. Mag., 36(5), 9/2000, 2506 – 2508).

Iwasaki et al. is relied upon as described above.

Iwasaki et al. fail to disclose a magnetic film meeting applicants' claimed magnetic flux density limitations.

However, Sun et al. teach FeCo films (*Title and Abstract*) possessing saturation magnetic flux densities meeting applicants' claimed limitations (*Abstract and Figure 1 –  $B_s = \text{saturated magnetic flux density} = 4\pi M_s$* ) wherein it is taught that high values of  $B_s$  are required for high areal recording density applications (*Introduction Section*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Iwasaki et al. to utilize a magnetic film meeting applicants' claimed saturation magnetic flux density limitations as taught by Sun et al. since such a film would be suitable for high areal recording density applications.

17. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. as applied above, and further in view of Osaka et al. ('512) and Sun et al. (IEEE Trans. Mag., 36(5), 9/2000, 2506 – 2508).

Saito et al. is relied upon as described above.

Regarding claims 2 and 10, Saito et al. fail to disclose controlling the stress to within +/- 0.5 GPa, nor whether the film possesses uniaxial magnetic anisotropy and/or a saturation magnetic flux density meeting applicants' claimed range limitation.

However, Osaka et al. teach the importance of controlling the magnitude of the stress in a film to be near 0 in order to insure films of uniform quality (*col. 5, lines 60 - 62*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the magnitude of the film stress through routine experimentation, especially given the teaching in Osaka et al. regarding the desire to minimize the film stress to insure uniform film quality in magnetic head applications.

Furthermore, Sun et al. teach FeCo films (*Title and Abstract*) possessing uniaxial anisotropy and saturation magnetic flux densities meeting applicants' claimed limitations (*Abstract and Figure 1 –  $B_s$  = saturated magnetic flux density =  $4\pi M_s$* ) wherein it is taught that high values of  $B_s$  are required for high areal recording density applications (*Introduction Section*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Saito et al. in view of Osaka et al. to utilize a magnetic film possessing uniaxial magnetic anisotropy and meeting applicants' claimed saturation magnetic flux density limitations as taught by Sun et al. since such a film would be suitable for high areal recording density applications.

18. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. as applied above, and further in view of Kamiguchi et al. ('218 B1).

Saito et al. is relied upon as described above.

Saito et al. fail to disclose a surface roughness of the film.

However, Kamiguchi et al. teach the importance of controlling the magnitude of the surface roughness of the films forming a magneto-resistive sensor to magnitudes of less than 1 nm in order to insure good magnetic characteristics and reduced inter-diffusion of atoms (*col. 9, line 26 bridging col. 10, line 20*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the magnitude of the film surface roughness through routine experimentation, especially given the teaching in Kamiguchi et al. regarding the desire to minimize the surface roughness to values meeting applicants' claimed limitations in order to insure good magnetic characteristics and reduced inter-diffusion of atoms.

### ***Conclusion***

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

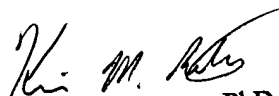
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1773

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB

February 15, 2006

  
Kevin M. Bernatz, PhD  
Primary Examiner